

 LESSON

Practicing Cryptology and Fraud Detection

Introduce your students to two dynamic STEM careers and activate their logical, analytical, and perceptive powers.

OBJECTIVE

Students will identify and apply the features of pattern rules and represent real-world problems by graphing and interpreting points on a coordinate plane.

TIME

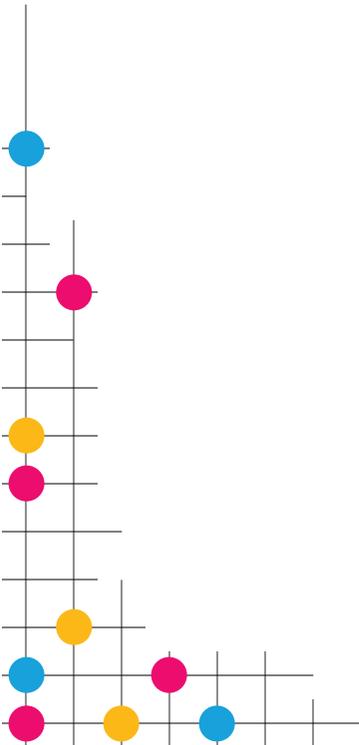
75 minutes

MATERIALS

- Crack the Code! activity sheet
- Find the Fraud! activity sheet

INSTRUCTIONS

1. Display the following job titles: cryptologist and fraud detective. Ask students what they think they mean. As they discuss, share the following prompts:
 - A cryptologist is a bit like a security guard. What does a security guard do?
 - A fraud detective is a type of detective. What do detectives do?
2. Distribute the Crack the Code! activity sheet. Explain that a cryptologist's job is to protect sensitive and important information by encoding or encrypting it. Show students the coded message at the top of the page. Tell them that the message was encrypted using a code called ROT1, where each letter in the alphabet has been shifted or "rotated" backward one place. Ask students to complete the key and decode the message. (Answer: I am a cryptologist.)
3. ROT1 is an example of symmetric encryption—a method that uses the same mathematical key to code and decode a message. Next, have students try tokenization, a non-mathematical, keyless approach to protecting data. Tokenization randomly assigns one letter of the alphabet (or punctuation) to act as a token that stands in for sensitive data. Have students create an emoji token vault on the activity sheet—then use it to create a short secret message.
4. Ask: *Which type of data protection can best keep information secure? Why?* Tokenization provides stronger protection since each letter's token is randomly assigned. You can't break the code by finding the key or learning the rule like in ROT1. Explain that new kinds of data protection make decoding secure information more difficult.
5. A fraud detective's job is to use technology to collect data and look for patterns. If they see something that doesn't fit the pattern, they raise a "red flag." Distribute the Find the Fraud! activity sheet. Review the graphs and have students plot the remaining data points to complete them. Ask if any of the data points raise a red flag. (Answers: Graph 1: E7 is a suspicious purchase; Graphs 2 and 3: no suspicious purchase; Graph 4: A1 is a suspicious purchase.)
6. Ask: *Why do fraud detectives monitor the purchasing habits of shoppers?* Explain that they are watching for fraudulent activity, including purchases made without the card owner's knowledge or permission.
7. Wrap up by discussing the skills and strengths on the classroom poster. Which qualities do they think cryptologists and fraud detectives have? Which qualities do your students believe they have in common with cryptologists and fraud detectives?



NAME _____

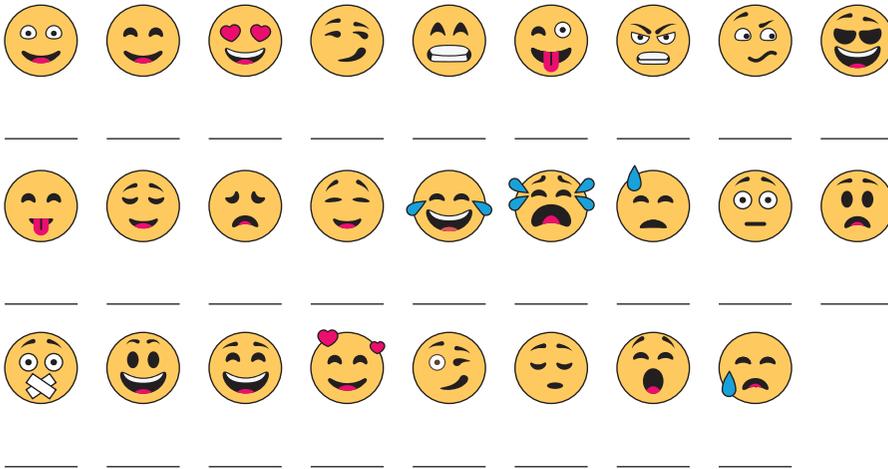
Crack the Code!

You are a cryptologist and have been given the task of deciphering and encrypting messages. Go!

1. Fill in the key on the ROT1 Code at right and then use the key to unlock this message:

J BN B DSZQUPMPHJTU

2. Create a token vault by randomly assigning a letter of the alphabet to the emoji below. Then, use tokenization to create your own secure message using the emoji in place of letters. Can your classmates crack your code?



Write your secure message here using the emoji code you created.

ROT1 CODE

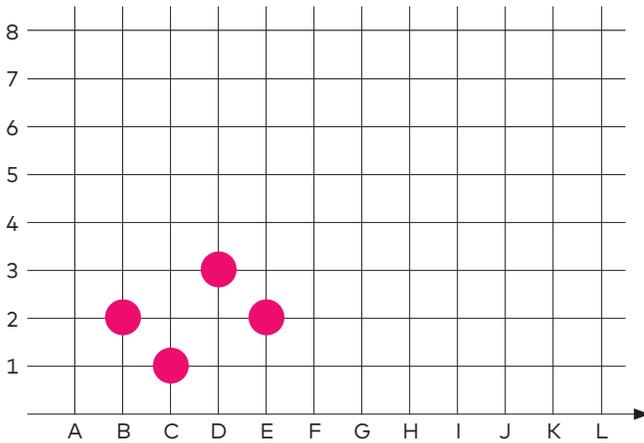
| Code | Letter |
|------|--------|
| A | Z |
| B | A |
| C | B |
| D | C |
| E | D |
| F | E |
| G | F |
| H | G |
| I | H |
| J | |
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NAME _____

Find the Fraud!

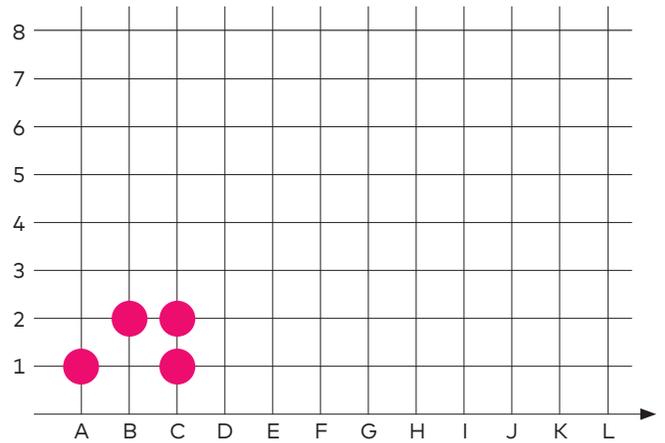
Finish plotting the data points on the graphs below. Then look for purchases among the four customers that don't fit the pattern. Make note of any red flags that point to signs of potential fraudulent behavior.

How often Amela makes a purchase



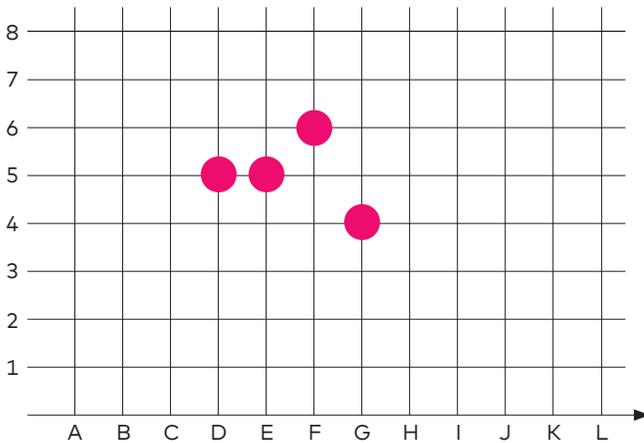
Plot the rest of the data:
E7, G1, G2, H3

How often Kwame makes a purchase online



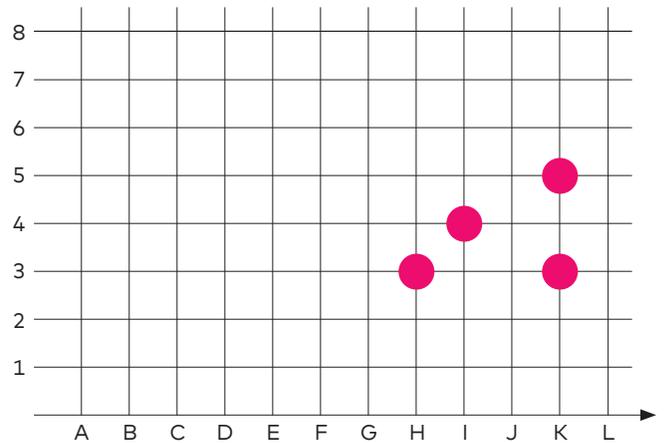
Plot the rest of the data:
C3, D1, D2, D3

Types of things Nadeem purchases



Plot the rest of the data:
E4, G5, H5, H6

Places Yumi makes purchases



Plot the rest of the data:
A1, F3, F4, G4

